

IN THE SPECIFICATION:

The specification as amended below with replacement paragraphs shows added text with underlining and deleted text with ~~strikethrough~~.

Please REPLACE paragraph [0079] with the following paragraph:

[0079]

~~FIG. 1 is a cross sectional view showing a general print head;~~

~~FIG. 2 is a cross sectional view showing a heater apparatus of a conventional ink-jet print head;~~

~~FIGS. 3A to 3C are views showing a process of fabricating a heater apparatus of an ink-jet print head according a first embodiment of the present invention;~~

~~FIGS. 4A to 4D are views showing a process of fabricating a heater apparatus of an ink-jet print head according a second embodiment of the present invention;~~

~~FIGS. 5A to 5C are views showing a process of fabricating a heater apparatus of an ink-jet print head according a third embodiment of the present invention;~~

~~FIGS. 6A to 6C~~FIGS. 6A to 6D are views showing a process of fabricating a heater apparatus of an ink-jet print head according a fourth embodiment of the present invention;

~~FIGS. 7A to 7C~~FIGS. 7A to 7D are views showing a process of fabricating a heater apparatus of an ink-jet print head according a fifth embodiment of the present invention; and

~~FIGS. 8A to 8C are views showing a process of fabricating a heater apparatus of an ink-jet print head according a sixth embodiment of the present invention.~~

Please REPLACE paragraph [00140] with the following paragraph:

[00140] ~~FIG. 6C~~FIG. 6D shows a heater apparatus 100" of an ink-jet print head, having heaters 133a and wires 134a according to a fourth embodiment of the present invention.

Please REPLACE paragraph [00144] with the following paragraph:

[00144] The heaters 133a formed in the heater pattern 133 have a dopant 138 doped therein by an ion implantation process after forming the heater pattern 133 and the wire pattern 134 over the substrate 131. The ion implantation process uses a photo resist pattern 136 to open heaters 133a to be formed later, formed over the substrate 131 through a photolithography process, as an ion implantation mask. Any type of ionizable dopant such as N₂, B, Ar, P or the like are used as a dopant, as shown in ~~FIG. 6B~~FIG. 6B. The dopant 138 regulates an electric resistance of the heaters 133a at a required value.

Please REPLACE paragraph [00146] with the following paragraph:

[00146] Alternatively, as shown in ~~FIG. 6B~~FIG. 6C, the wire pattern 134' can be formed to have a dopant 138' doped therein by performing during an ion implantation process for heaters 133a' without an ion implantation mask. In this case, a sum total in thickness of a heater pattern 133' and a wire pattern 134' is 500Å. Particularly, the wire pattern 134' is thick enough to assure the dopant 138' doped during the ion implantation process does not affect an electric resistance of the wires 134a' and the heater pattern 133' is thin enough to assure the dopant 138' doped during the ion implantation process to thereby regulate an electric resistance of the heaters 133a'.

Please REPLACE paragraph [00148] with the following paragraph:

[00148] A fabrication method of the heater apparatus 100" of the ink-jet print head as constructed according to the fourth embodiment of the present invention will be described in great detail with reference to ~~FIGS. 6A through 6C~~FIGS. 6A through 6D.

Please REPLACE paragraph [00153] with the following paragraph:

[00153] After that, a photo resist is formed over the substrate 131 having the wire pattern 134 and the heater pattern 133 formed thereover. Then, as shown in ~~FIG. 6B~~FIG. 6B, the photo resist pattern 136 to open the heaters to be formed later is formed by performing a light exposure and a developing with respect to the photo resist through a photolithography process of using a photo mask for heaters.

Please REPLACE paragraph [00156] with the following paragraph:

[00156] Alternatively, as shown in ~~FIG. 6B~~FIG. 6C, when a sum total in thickness of the heater pattern 133' and the wire pattern 134' is 500Å, and the wire pattern 134' is thick enough to assure a dopant 138' doped during the ion implantation process does not affect an electric resistance of the wires 134a' and the heater pattern 133' is thin enough to assure the dopant 138' doped during the ion implantation process to regulate an electric resistance of heaters 133a', the ion implantation process can be carried out with respect to the heater pattern 133' without using an ion implantation mask. Thus, both the heater pattern 133' and the wire pattern 134' are doped. At this point, the dopant 138' is an ionizable dopant such as N₂, B, Ar, P or the like.

Please REPLACE paragraph [00158] with the following paragraph:

[00158] After annealing the substrate 131, as shown in ~~FIG. 6C~~FIG. 6D, over a whole surface of the resultant substrate 131 are formed in turn the passivation layer 137 such as a silicon nitride, silicon carbide or the like and the anti- cavitation layer 139 made of a metal layer such as Ta, TaN, TiN or the like. The fabrication of the heater apparatus 100''' of the ink-jet print head is thus completed.

Please REPLACE paragraph [00160] with the following paragraph:

[00160] ~~FIG. 7C~~FIG. 7D shows a heater apparatus 100''' of an ink-jet print head, having heaters 143a and wires 144a according to a fifth embodiment of the present invention.

Please REPLACE paragraph [00164] with the following paragraph:

[00164] The heaters 143a formed in the heater pattern 143 have a dopant 148 doped therein by an ion implantation process after forming the protective layer 145 on the heater pattern 143 and the wire pattern 144. The ion implantation process uses a photo resist pattern 147 to open heaters (to be formed later), formed on the protective layer 145 through a photolithography process as an ion implantation mask, and any type of ionizable dopant including N₂, B, Ar, P or the like as a dopant, as shown in ~~FIG. 7B~~FIG. 7B. The dopant 148 functions to regulate an electric resistance of the heaters 143a at a required value.

Please REPLACE paragraph [00166] with the following paragraph:

[00166] Alternatively, as shown in ~~FIG. 7BB~~FIG. 7C, the wire pattern 144' can be formed to have a dopant 148' doped therein by performing without an ion implantation mask during an ion implantation process for the heaters 143a'. In this case, a sum total in thickness of the heater pattern 143' and the wire pattern 144' is 500Å. Particularly, the wire pattern 144' is thick enough to assure the dopant 148' doped during the ion implantation process does not affect an electric resistance of the wires 144a' and the heater pattern 143' is thin enough to assure that the dopant 148' doped during the ion implantation process to regulate an electric resistance of the heaters 143a'.

Please REPLACE paragraph [00169] with the following paragraph:

[00169] A fabrication method of the heater apparatus 100''' of the ink-jet print head as constructed according to the fifth embodiment of the present invention will be described in great detail with reference to ~~FIGS. 7A through 7C~~FIGS. 7A through 7D.

Please REPLACE paragraph [00175] with the following paragraph:

[00175] After forming the protective layer 145, a photo resist is formed on the protective layer 145, and then as shown in ~~FIG. 7BA~~FIG. 7B, a photo resist pattern 147 for opening heaters to be formed later is formed by performing a light exposure and a developing with respect to the photo resist through a photolithography process of using a photo mask for heaters.

Please REPLACE paragraph [00178] with the following paragraph:

[00178] Alternatively, as shown in ~~FIG. 7BB~~FIG. 7C, when a sum total in thickness of a heater pattern 143' and a wire pattern 144' is 500Å, and the wire pattern 144' is thick enough to assure a dopant 148' doped during the ion implantation process does not affect an electric resistance of wires 144a', and the heater pattern 143' is thin enough to assure the dopant 148' doped during the ion implantation process to regulate an electric resistance of heaters 143a', the ion implantation process can be carried out with respect to the heater pattern 143' without using an ion implantation mask . Thus, both the heater pattern 143' and the wire pattern 144' are

doped. At this point, the dopant 148' is an ionizable dopant including N₂, B, Ar, P or the like.

AMENDMENTS TO THE DRAWINGS:

The drawings are amended as described below by presenting replacement figures as attached hereto. The figure numbering 6BA, 6BB, 6C, 7BA, 7BB and 7C has been changed.